

REMARKS

Claims 1-4, 7-12, 14-15, 24-25, 27-38, 41-42, 47-52, 70-86, 88-90, 92-97, 100-113, 117-120, 122-124, 131-146, 149-150, 155-160 and 178-189 are now pending in the application. Claims 5-6, 13, 16-23, 26, 39-40, 43-46, 53-69, 87, 91, 98-99, 114-116, 121, 125-130, 147-148, 151-154, 161-177 and 190-199 have been cancelled. Claims 1, 14, 50, and 182 have been amended. No new matter has been added. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claims 1-4, 7-12, 14-15, 24-25, 27-38, 41-42, 47-52, 70-86, 88-90, 92-97 and 100-110 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

Claim 1 has been amended to remove recitation of "said" one or more cationic species of MII. Claim 14 has been amended to depend upon Claim 7. In view of these amendments, Applicants respectfully submit that the rejections of independent Claim 1 and dependent Claim 14 are now moot.

With regard to the rejection of Claim 12, Applicants respectfully request the Examiner's reconsideration. Claim 12, which depends upon Claim 7 and ultimately Claim 1, recites a group of cationic species from which MI (of the hydride MI^xH_x) is selected. Claim 1 on the other hand recites a group of cationic species from which MII of the hydroxide composition $(MII^y(OH)_y)$ is selected. As such, Applicants respectfully submit that Claim 12 properly depends upon Claims 7 and does not have a broader

scope than independent Claim 1, as alleged. As such, the Examiner's reconsideration and withdrawal of the rejection for indefiniteness of Claims 1, 12, and 14, and allowance of Claims 2-4, 7-12, 15, 24-25, 27-38, 41-42, 47-52, 70-86, 88-90, 92-97 and 100-110 which depend therefrom, is respectfully requested.

REJECTION UNDER 35 U.S.C. §§ 102 AND 103

Claims 1-4, 7-9, 12, 14-15, 24-25, 27-30, 70, 73-84, 88-90, 92-97, 102-113, 117-118, 122-124, 131-138, 178-179 and 181-189 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Chen et al. (U.S. Pat. No. 6,471,936) (hereinafter "Chen"). This rejection is respectfully traversed.

Independent Claims 1, 82, 111, 178 and 187, as well as their dependent Claims are patentable over Chen. The Chen reference fails to describe, either explicitly or inherently, that hydrogen is produced in a reaction between a hydride and a hydroxide composition, such as is found in independent Claims 1, 82, and 178. Similarly, Chen does not describe the hydrogen storage compositions of either independent Claims 111 or 187. Claim 111 is directed to a hydrogen storage composition having a hydrogenated state with a dehydrated hydroxide and a hydride and a dehydrogenated state with an oxide. Claim 187 provides a mixture of a dehydrated hydroxide and a hydride to promote release of hydrogen in the presence of a catalyst, elevated temperature, or both.

Nothing in Chen teaches or suggests that hydrogen gas will be produced when a dehydrated hydroxide composition and a hydride composition are reacted together. Nor

does Chen teach or suggest specific reactions of hydroxide and hydride with one another to form hydrogen. Inherency may not be established by mere probabilities or possibilities. *Mehl/Biophile International Corp. v. Milgraum*, 52 USPQ.2d 1303, 1305 (Fed. Cir. 1999). The fact that a certain thing may result from a given set of circumstances is not sufficient to support a rejection under inherent anticipation. *Id.*, citing *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981). Furthermore, in asserting obviousness, it is important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does in an obviousness determination. *Takeda Chem. Ind. v. Alphapharm Pty, Ltd.*, 492 F.3d 1350, 1356-57 (Fed. Cir. 2007) (citing *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007)). The scope and content of the Chen reference fails to provide any disclosure or suggestion of producing hydrogen in the calcination process, which the rejections rely upon to render the claimed invention inherently anticipated and/or obvious.

The Chen reference pertains to two entirely independent steps. The first is directed to preparing a carbon-based sorbent material by doping with alkali metal(s). The Chen reference describes doping carbon materials with alkali metals in a solid state reaction between carbon materials and a variety of alkali metal salts in a calcination reaction (high temperature treatment under inert gases like nitrogen, argon, helium or reductive gases like hydrogen) to change the structural and electronic properties of the carbon material. Col. 2, lines 47-54; Col. 5, lines 17-23. Notably, none of the examples set forth in Chen of doping carbon nanotubes employs a mixture of salts; rather each example only uses a single salt (e.g., LiI, LiNO₃, NaOH, and KOH) for each calcination

reaction. As such, there is no specific teaching of the claimed combinations of a dehydrated hydroxide and a hydride to form hydrogen and the mere suggestion of multiple salts is not sufficient to render the claimed invention inherently anticipated.

The second aspect of Chen is directed to using the pre-formed alkali-metal doped carbon-based sorbent for reversible storage of hydrogen gas. Thus, after forming the doped carbon-based sorbent in the first step (by intercalating alkali metals into the carbon material), Chen subsequently reversibly stores and releases hydrogen from the pre-formed sorbent. In this regard, Chen neither teaches nor enables a hydrogen generation reaction in either step described, but rather provides a preparation step for doped sorbent and a hydrogen adsorption/desorption step.

Furthermore, without the benefit of impermissible hindsight, one of skill in the art would have no apparent reason to select among the various options set forth in Chen to arrive at the claimed invention. The rejection requires a skilled artisan to select among a variety of options, including selecting an alkali metal salt (including Li, Na, K, Rb, Cs, or mixtures thereof) of carbonates, nitrates, hydroxide, halogenides, nitrates or mixtures thereof. Col. 5, lines 2-6 and 44-46. Moreover, Chen *teaches away* from selecting hydroxide or carbonates during this calcination process, stating that it is preferred to use a salt lacking oxygen in the calcination process. Col. 5, lines 27-28. As noted above, the examples in Chen merely set forth a single alkali metal salt reacted with carbon nanotubes for calcination. Without the benefit of impermissible hindsight, one of skill in the art would have no apparent reason to select a combination of a dehydrated hydroxide (*i.e.*, salt containing oxygen) and a hydride from the various salts set forth in Chen to react at specific conditions required to generate hydrogen. Hence, a hydrogen

generation reaction does not necessarily result from the variety of different options set forth for the calcination/doping reaction of Chen; thus Chen does not inherently anticipate or render the claimed invention obvious. As such, Applicants respectfully request the Examiner's reconsideration of the Chen reference's teachings, as it does not inherently anticipate or render the invention of Claims 1-4, 7-9, 12, 14-15, 24-25, 27-30, 70, 73-84, 88-90, 92-97, 102-113, 117-118, 122-124, 131-138, 178-179 and 181-189 obvious.

ALLOWABLE SUBJECT MATTER

Applicants thank the Examiner for the indication of allowable subject matter in dependent Claims 119, 120, 139-146, 149-150, 155-160 and 180. In view of the remarks above, Applicants believe that all of the pending claims are presently in condition for allowance.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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HARNESS, DICKY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

JMW/slg

By: Jennifer M. Woodside Wojtala

Anna M. Budde
Reg. No. 35,085

Jennifer M. Woodside Wojtala
Reg. No. 50,721